REMARKS

Allowable Subject Matter

Applicants gratefully acknowledge the Examiner's indication the claims 8, 9, 13, and 44 recite allowable subject matter. See page 21 of the January 24, 2011 Office Action.

Amendments

Claim 1 is amended to be directed to a method for preparation of an alignment layer. Similar amendments are made to claim 10. See, for example, page 6, lines 14-24 and page 12, lines 7-10. Compare claim 18 which is directed to a method of preparing a laminate. Claims 2-9, 12-14, and 19-37 are amended to be consistent with the language of amended claim 1. Claims 4, 17, and 38-41 are cancelled.

Claim 18 is amended to depend from claim 1 and to recite afterpolymerizing or crosslinking the liquid crystal material, the at least one reactive mesogen additive is entangled in the alignment layer, is chemically bound to the layer of liquid crystal material. See, e.g., page 15, lines 8-9.

Claim 15 is amended to be in independent form. Additionally, claim 15 is amended to recite that the polymer precursor is a solution and comprises a solvent, the at least one reactive mesogen additive, and a polymer component, the polymer component comprising a polyimide polymer, triacetate cellulose, diacetate cellulose, or a precursor of the polyimide polymer. Claim 15 is also amended to recite that the polymer precursor solution comprises less than 20 % by weight of the at least one reactive mesogen additive. Claim 42 is amended to recite that the polymer precursor comprises less than 10 % by weight of the reactive mesogen additive. Claim 44 is amended to be consistent with the language of amended claim 15.

New claims 49 and 50 correspond to allowable claims 8 and 9. New claim 51 is directed to an intermediate structure of a laminate, in which the intermediate structure consists of a substrate and an alignment layer in accordance with the claimed invention. New claims 52-54 correspond to prior claims 38, 39, and 41, except that they depend from new claim 51. New claim 55 is directed to a method of preparing a laminate using the intermediate structure of claim 51. New claim 56 corresponds to prior claim 17 (now

cancelled) and depends from claim 18.

Rejection under 35 USC 112, second paragraph

Claims 15 and 42-48 are rejected as being indefinite under 35 USC 112, second paragraph. This rejection is respectfully traversed.

In the rejection it is asserted that claim 15 depends on claim 1, which recites an alignment layer, while "claim 15 recites a polymer precursor." It is argued that as a result, it is unclear whether claim 15 recites a polymer precursor or an alignment layer.

The language of claim 15 is sufficiently clear. Claim 15 recites a polymer precursor as indicated in the rejection. The reference to the alignment layer of claim 1 does not make the language of claim 15 indefinite. As one of ordinary skill in the art would recognize from the preamble, as well as the body of the claim, claim 15 recites a polymer precursor.

In any event, to facilitate prosecution, claim 15 is amended to be in independent form. Further, claim 15 is amended to provide antecedent basis for the recitations of triacetate cellulose and diacetate cellulose in claim 44.

In view of the above remarks, withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 102(b) in view of Winkler

Claims 1, 3-6, 17-21, 27, 28, 31, 33-35, and 38 are rejected as being anticipated under 35 USC 102(b) in view of Winkler (US 6,538,712). This rejection is respectfully traversed.

As described at column 6, lines 45-60, Winkler (US '712) discloses an O-plate compensator that comprises a polymerized reactive liquid crystal thin film and a rubbed polymer alignment layer. The alignment layer incorporates a polyimide with bulky side-chain groups, and is produced by solvent casting a thin film of the polyimide material onto a substrate. The polyimide surface is then mechanically buffed, and a thin film of reactive liquid crystal material is deposited onto the polyimide alignment layer, also using a solvent casting technique. The solvent is evaporated and the reactive liquid crystal film is photopolymerized using ultraviolet light.

The rejection refers to the disclosure at column 7-8 Winkler (US '712), which describes the process embodiment shown in Figure 4. In this embodiment, a liquid crystal alignment layer, consisting of a polyimide polymer material incorporating a plurality of bulky

side-chain groups, is deposited onto an optically transparent substrate. Depositing of the alignment layer is preferably performed by solvent casting. The alignment layer material is dissolved in a solvent, a thin film of the solution is applied to the surface of the substrate, and then the solvent is evaporated off leaving a thin film alignment layer. The solvents mentioned are toluene, monochlorobenzene, methylethylketone, cyclohexanone, and propyleneglycolmonomethyletheracetate (PGMEA). See column 7, line 45 – column 8, line 21.

After buffing the alignment layer, a thin film of polymerizable liquid crystal material (such as acrylates, epoxides, or vinyl ethers) is deposited onto the alignment layer. According to one embodiment, a polymerizable liquid crystal material is solvent cast onto the alignment layer using monochlorobenzene as solvent. The liquid crystal thin film is then polymerized via illumination with actinic radiation.

In the rejection, it is argued that the solvent (monochlorobenzene) used for preparing the alignment layer by solvent casting can be the same as the solvent used for solvent casting the polymerizable liquid crystal material. Thus, the rejection concludes that in such a case, during solvent casting of the polymerizable liquid crystal material, the solvent will act as a carrier for infiltration of the polymerizable liquid crystal material into the alignment layer.

However, this conclusion is clearly speculation. Winkler (US '712) provides no disclosure or suggestion that in such an embodiment the polymerizable liquid crystal material will infiltrate into the alignment layer. Even if one might assert that the solvent used during solvent casting of the polymerizable liquid crystal material will have some impact on the alignment layer, there is nothing within the disclosure of Winkler (US '712) that suggests infiltration of the polymerizable liquid crystal material. Furthermore, the rejection merely concludes that infiltration will occur, but provides no rational as to why such alleged infiltration will necessarily and always occur. See, for example, *Schering Corp. v. Geneva Pharmaceutical Inc.,* 67 USPQ2d (Fed. Cir. 2003).

In any event, the disclosure of Winkler (US '712) does not suggest a process in accordance with applicants' amended claim 1. For example, Winkler (US '712) does not describe or suggest forming an alignment layer by depositing onto a surface a layer of a solution containing a polymer/polymer precursor, and processing the layer of solution to form the alignment layer, wherein at least one reactive mesogen additive is incorporated into the layer of solution before the processing.

Additionally, the disclosure of Winkler (US '712) does not disclose or suggest an intermediate structure which consists of a substrate and an alignment layer wherein the alignment layer contains unreacted polymerizable groups from a reactive mesogen additive. Compare applicants' new claim 51.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler fails to anticipate applicants' claimed invention under 35 USC 102(b). Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 102(b) in view of Kumar

Claims 15, 42, 47 and 48 are rejected as being anticipated under 35 USC 102(b) in view of Kumar (WO 01/18594; US 6,939,587). This rejection is respectfully traversed.

Kumar discloses a procedure for making light modulating devices made with composite organic materials utilizing self-aligned layers. The procedure is said to combine two processes, in-situ photoalignment using polarized ultraviolet (UV) light exposure and anisotropic phase separation using phase-separated composite organic film (PSCOF). The procedure can be performed via a one-step process or a multi-step process to prepare aligned liquid crystal films adjacent a polymer layer. See the abstract.

The rejection refers to the disclosure at column 8, lines 8-25 where Kumar describes an embodiment of the one-step process. At column 6, line 35-column 7, line 12, Kumar generally describes that one-step process. In the process, a mixture is prepared containing a liquid crystal material, a prepolymer, and a polarization-sensitive aligning agent. The mixture is deposited on a substrate and irradiated with light. This induces polymerization of the prepolymer, and, as polymerization proceeds, phase separation between the liquid crystal material and the polymer/aligning agent occurs. Kumar refer to this as "polymerization induced phase separation."

At column 8, lines 8-36, Kumar describe an embodiment of the one-step process wherein a mixture containing a reactive liquid crystal monomer, a photomonomer and a low-temperature-cure polyimide is spin-coated onto a substrate. The coating is then irradiated with UV light (see Figure 2) which passes through a linear polarizer, a substrate, and an electrode to irradiate the mixture coating. The polarized UV light induces phase separation to form an alignment layer and a liquid crystal layer, and, simultaneously, induces alignment of reactive liquid crystal monomers at the interface of the two layers.

In the rejection, it is argued that, as a result of the phase separation of reactive liquid crystal monomer induced by the irradiation with UV light, the amount of reactive liquid crystal monomer in the alignment layer is expected to be small. However, this argument relates to the alignment layer after phase separation. This does not relate to a polymer precursor solution as recited in applicants' claim 15. Prior to the phase separation, the mixture that is coated onto the substrate contains a significant amount of reactive liquid crystal monomer, since this portion of the mixture forms the liquid crystal layer. Kumar does not suggest a polymer precursor solution that contains less than 20 % by weight of reactive mesogen additive. See applicants' claim 15. Similarly, Kumar does not disclose or suggest a polymer precursor solution containing of amounts reactive mesogen additive in accordance with applicants' claims 42, 47, and 48.

In view of the above remarks, it is respectfully submitted that the disclosure of Kumar fails to anticipate applicants' claimed invention under 35 USC 102(b). Withdrawal of the rejection is respectfully requested.

Rejections under 35 USC 103(a) in view of Winkler

Claims 2, 14, 22-24, and 32 are rejected as being obvious under 35 USC 103(a) in view of Winkler (US 6,538,712). In addition, claim 41 is also rejected as being obvious under 35 USC 103(a) in view of Winkler (US 6,538,712). These rejections are respectfully traversed.

The disclosure of Winkler (US '712) is discussed above. Here again, the rejection is based on the premise that, during solvent casting of the polymerizable liquid crystal material, the solvent will act as a carrier for infiltration of the polymerizable liquid crystal material into the alignment layer. Expanding on this premise, it is asserted in the rejection of claims 2, 14,

22-24, 32, and 41 that the amount of infiltration would not be expected to be large. Based on this expectation, the rejection further concludes that the amounts of reactive mesogen additive in the alignment layer recited in applicants' claims 2, 14, 22-24, 32, and 41 would be obvious.

However, as discussed above, the conclusion regarding infiltration is clearly speculation. Moreover, the alleged "expectation" of the amount of infiltrated material is further speculative. Winkler (US '712) provides no disclosure or suggestion that the polymerizable liquid crystal material will infiltrate into the alignment layer. Even if one might assert that the solvent used during solvent casting of the polymerizable liquid crystal material will have some impact on the alignment layer, there is nothing within the disclosure of Winkler (US '712) that suggests infiltration of the polymerizable liquid crystal material.

Additionally, although the rejection asserts that the infiltration time is short, there is no rationale as to what amount of alleged infiltration will actually occur in a given time period of alleged infiltration. No rationale for the amount of alleged infiltration can be gleaned from the Winkler (US '712) disclosure since the disclosure does not mention any such infiltration, or even imply that such infiltration will occur.

In any event, the disclosure of Winkler (US '712) does not suggest a process in accordance with applicants' amended claim 1. For example, Winkler (US '712) does not describe or suggest forming an alignment layer by depositing onto a surface a layer of a solution containing a polymer/polymer precursor, and processing the layer of solution to form the alignment layer, wherein at least one reactive mesogen additive is incorporated into the layer of solution before the processing.

Additionally, the disclosure of Winkler (US '712) does not disclose or suggest an intermediate structure which consists of a substrate and an alignment layer wherein the alignment layer contains unreacted polymerizable groups from a reactive mesogen additive. Compare applicants' new claim 51.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler (US '712) fails to render obvious applicants' claimed invention under 35 USC 103(a). Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Winkler and Tsuboyama et al.

Claim 7 is rejected as being obvious in view of Winkler (US 6,538,712) in

combination with Tsuboyama et al. (US 5,099,344). This rejection is respectfully traversed.

The disclosure of Winkler (US '712) is discussed above. In the rejection, it is acknowledged that Winkler (US'712) fails to disclose an alignment layer which comprises a polyimide film in accordance with applicants' claim 7. In the rejection, it is argued that Tsuboyama et al. disclose such a polyimide alignment layer. See column 4, lines 8-18.

However, the disclosure of Tsuboyama et al. does not overcome the deficiencies in the disclosure of Winkler (US'712), as discussed above. Tsuboyama et al. provide no suggestion of the presence of reactive mesogenic additives in the alignment layer. Thus, Tsuboyama et al. provide no suggestion as to a process for making an alignment layer containing reactive mesogenic additives. As a result, Tsuboyama et al. provide no suggestion as to how one would modify the procedure disclosed by Winkler (US '712) in such a manner as to arrive at a method in accordance with applicants' claimed method.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler (US '712), taken alone or in combination with the disclosure of Tsuboyama et al, fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Winkler and Ichimura et al.

Claims 10-11 are rejected as being obvious in view of Winkler (US 6,538,712) and Ichimura et al. (US 6,001,277). This rejection is traversed.

The disclosure of Winkler (US '712) is discussed above. In the rejection it is acknowledged that Winkler (US '712) does not disclose a command layer comprising an isomerizable azobenzene compound.

Ichimura et al. disclose a liquid-crystal display device that comprises a pair of substrates, each of which is provided with a liquid-crystal alignment film, at least one the substrates having an electrode, and a liquid crystal layer held between the substrates. The liquid-crystal alignment films comprise a resin that contains photoisomerizable and dichroic structural units, such as units of azobenzene derivatives and stilbene derivatives. See column 4, lines 7-47. As described at column 9, lines 31-44, the photoisomerizable and dichroic structural units may be mixed with the resin and can be chemically bonded to each other or to the resin by at least one of irradiation with light and heating.

However, the disclosure of Ichimura et al. does not overcome the deficiencies in the disclosure of Winkler (US'712), as discussed above. Ichimura et al. do not disclose or suggest an alignment layer that comprises a polymer film containing at least one reactive mesogen additive, wherein the additive has unreacted polymerizable groups after preparation of the alignment layer. As a result, Ichimura et al. provide no suggestion as to how one would modify the procedure disclosed by Winkler (US '712) in such a manner as to arrive at a method in accordance with applicants' claimed method.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler (US '712), taken alone or in combination with the disclosure of Ichimura et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

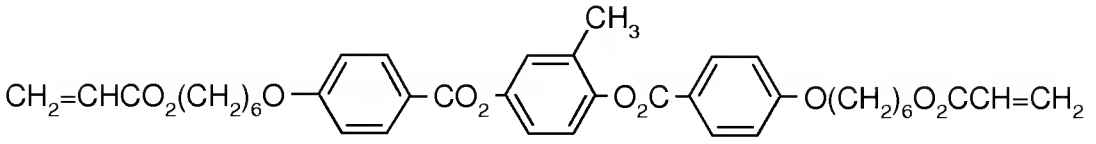
Rejections under 35 USC 103(a) in view of Winkler (US '712) and Winkler (US '634)

Claims 12 and 29-30 are rejected as being obvious in view of Winkler (US 6,538,712) in combination with Winkler (US 6,320,634). In addition, claim 39 is also rejected as being obvious in view of Winkler (US 6,538,712) in combination with Winkler (US 6,320,634).

The disclosure of Winkler (US '712) is discussed above. In the rejection it is acknowledged that Winkler (US '712) does not disclose details on reactive mesogen compounds.

Winkler (US '634) discloses an O-plate compensator for use with a liquid crystal display. The O-plate compensator is a uniaxial birefringent thin film comprising an organic liquid crystal polymer. The film can be cast from a liquid crystal polymer solution or from a reactive liquid crystal monomer. See column 9, lines 39-56.

The rejection refers to Fig. 12B of Winkler (US '634) which shows chemical structure of C6M, described as a conventional liquid crystal monomer:



In the rejection, it is asserted that it would be obvious to use a conventional liquid crystal monomer, such as C6M disclosed by Winkler (US '634), as the polymerizable liquid crystal material in the display of Winkler (US '712). Further, it is asserted that the amount of

infiltrated polymerizable liquid crystal material in Winkler (US '712) would be expected to be low, and thus would render obvious the amounts of reactive mesogen recited in applicants' claims 29-30.

Here again, the rejection is based on the premise that, during solvent casting of the polymerizable liquid crystal material, the solvent will act as a carrier for infiltration of the polymerizable liquid crystal material into the alignment layer. Expanding on this premise, it is asserted in the rejection of claims 29-30 that the amount of infiltration would not be expected to be large. Based on this expectation, the rejection further concludes that the amounts of reactive mesogen additive in the alignment layer recited in applicants' claims 29-30 would be obvious. However, as discussed above, the conclusion regarding infiltration is clearly speculation. Moreover, the alleged "expectation" of the amount of infiltrated material is further speculative.

Winkler (US '712) provides no disclosure or suggestion that the polymerizable liquid crystal material will infiltrate into the alignment layer. Even if one might assert that the solvent used during solvent casting of the polymerizable liquid crystal material will have some impact on the alignment layer, there is nothing within the disclosure of Winkler (US '712) that suggests infiltration of the polymerizable liquid crystal material.

Additionally, although the rejection asserts that the infiltration time is short, there is no rationale as to what amount of alleged infiltration will actually occur in a given time period of alleged infiltration. No rationale for the amount of alleged infiltration can be gleaned from the Winkler (US '712) disclosure since the disclosure does not mention any such infiltration, or even imply that such infiltration will occur.

In any event, the disclosure of Winkler (US '634) does not overcome the deficiencies in the disclosure of Winkler (US'712), as discussed above. Winkler (US '634) does not disclose or suggest an alignment layer that comprises a polymer film containing at least one reactive mesogen additive, wherein the additive has unreacted polymerizable groups after preparation of the alignment layer. As a result, Winkler (US '634) provides no suggestion as to how one would modify the procedure disclosed by Winkler (US '712) in such a manner as to arrive at a method in accordance with applicants' claimed method.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler (US '712), taken alone or in combination with the disclosure of Winkler (US '634),

fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Winkler (US '712) and Komatsu et al.

Claims 25, 26, 36, and 37 are rejected as being obvious in view of Winkler (US 6,538,712) in combination with Komatsu et al. (US 5,989,758).

The disclosure of Winkler (US '712) is discussed above. It is acknowledged in the rejection that Winkler (US'712) fails to disclose the birefringence of the alignment layer. However, it is argued that Komatsu et al. disclose an orientation substrate which is "optically isotropic." See column 24, lines 14-19. In the rejection, it is further asserted that "optically isotropic" means a birefringence of zero.

Komatsu et al. do not define what is meant by "optically isotropic." One of ordinary skill in the art reading the disclosure of Komatsu et al. does not know whether "optically isotropic" in the context of the disclosure means a birefringence of less than 1, less than 0.1, or zero, or some other value. Nothing within the disclosure of Komatsu et al. or within the rejection supports the conclusion that "optically isotropic," in the context of the Komatsu et al. disclosure, definitively means a birefringence of zero.

In any event, the disclosure of Komatsu et al. does not overcome the deficiencies in the disclosure of Winkler (US'712) as discussed above. Komatsu et al. provide no suggestion of the presence of reactive mesogenic additives in the alignment layer.

In view of the above remarks, it is respectfully submitted that the disclosure of Winkler (US '712), taken alone or in combination with the disclosure of Komatsu et al., fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Winkler and Lacker et al.

Claim 40 is rejected as being obvious in view of Winkler (US 6,538,712) in view of Lacker et al. (US 4,944,576). This rejection is rendered moot by the cancellation of claim 40.

Rejection under 35 USC 103(a) in view of Kumar and Winkler (US '634)

Claim 43-44 are rejected as being obvious in view of Kumar (WO 01/18594; US

6,939,587) in view of Winkler (US 6,320,634). This rejection is respectfully traversed.

Firstly, it is noted that this rejection is applied against claim 44. However, this is an apparent error, since at page 21 of the Office Action it is indicted that claim 44 recites allowable subject matter.

The disclosures of Kumar and Winkler (US '634) are both discussed above. In the rejection it is asserted that it would be obvious to use a conventional liquid crystal monomer, such as C6M disclosed by Winkler (US '634), in the display of Kumar.

However, the disclosure of Winkler (US '634) does not overcome the deficiencies in the disclosure of Kumar as discussed above. Kumar does not suggest a polymer precursor solution that contains less than 20 % by weight of reactive mesogen additive. See applicants' claim 15. Winkler (US '634) also fails to suggest a polymer precursor solution that contains less than 20 % by weight of reactive mesogen additive.

In view of the above remarks, it is respectfully submitted that the disclosure Kumar, taken alone or in combination with the disclosure of Winkler (US '634), fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

Rejection under 35 USC 103(a) in view of Kumar and Komatsu

Claim 45-46 are rejected as being obvious in view of Kumar (WO 01/18594; US 6,939,587) in view of Komatsu (US 5,989,758).

The disclosures of Kumar and Komatsu are both discussed above. In the rejection it is asserted that it would be obvious to for the precursor composition of Kumar to provide an alignment layer with a birefringence of less than 0.05 or less than 0.005.

However, the disclosure of Komatsu does not overcome the deficiencies in the disclosure of Kumar as discussed above. Kumar does not suggest a polymer precursor solution that contains less than 20 % by weight of reactive mesogen additive. See applicants' claim 15. Komatsu also fails to suggest a polymer precursor solution that contains less than 20 % by weight of reactive mesogen additive.

In view of the above remarks, it is respectfully submitted that the disclosure Kumar, taken alone or in combination with the disclosure of Komatsu, fails to render obvious applicants' claimed invention. Withdrawal of the rejection is respectfully requested.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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